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United States General Accounting Office

GAO

Report to the Secretary of Defense

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June 1986

TEST RESOURCES

Early Testing of Major ASW Weapons Can Be Enhanced by Increased Focus on Test Resources

This is an unclassified Executive Summary furnished in lieu of a report containing security information.

ORIGINAL

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GAO

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division
B-222139

June 30, 1986

The Honorable Caspar W. Weinberger
The Secretary of Defense

Dear Mr. Secretary:

This report summarizes our review of early testing of major antisubmarine warfare weapons.

This report contains recommendations to you in chapter 4. As you know, 31 U.S.C. 720 requires the head of a federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Secretary of the Navy. Copies are also being sent to the Director, Office of Management and Budget; the Chairmen of the Senate and House Armed Services Committees; and other appropriate congressional committees.

Sincerely yours,

Frank C Conahan

Frank C. Conahan
Director

Executive Summary

Purpose

The Navy's antisubmarine warfare (ASW) mission starts with the initial detection of Soviet submarines by air, surface and underwater sonar systems, and ends with their destruction by weapon systems. To accomplish this mission, the Navy currently spends over $10 billion a year to develop and acquire these weapon systems.

ASW weapon systems are becoming increasingly sophisticated to counter Soviet submarine improvements and to operate in harsh ocean environments. Testing these systems is becoming more important, requiring a corresponding increase in the sophistication of test resources. The Congress has consistently shown an interest in the role that test and evaluation plays in providing data necessary for making acquisition decisions on major weapon systems.

GAO initiated this review to determine

- whether three significant test resources used during the Development, Test and Evaluation (DT&E) phase of testing adequately represent Soviet submarine capabilities and the ocean environment in which they operate and
- whether the process for identifying and acquiring test resources during the DT&E phase is effective.

GAO identified the extent to which two major ASW weapons, the Advanced Capability (ADCAP) and MK-50 torpedoes, currently under development, rely on critical test resources to demonstrate DT&E objectives. These weapons were selected because of their importance to the Navy in accomplishing its ASW mission and because their costs are significant.

Background

Two major test phases support the development and production decision processes. DT&E is intended to identify design problems during development, and operational test and evaluation (OT&E) is intended to measure weapon system performance in a realistic operational environment before the final production decision is made. The Department of Defense (DOD) attempts to shorten the acquisition process frequently change the timing of OT&E so that its effectiveness in influencing the initial production decision is reduced. Accordingly, DOD and the Navy are relying on the results of DT&E more extensively. To accomplish DT&E objectives for its ASW weapon systems, the Navy uses test resources that are intended to represent enemy submarines and the ocean environments in which they operate.

Results in Brief

DT&E resources do not completely represent the threat environment. This limitation reduces the confidence that performance has been adequately demonstrated. ASW test plans do not adequately address test resource limitations and the potential adverse effect these limitations can have in demonstrating test objectives. DOD now requires test plans to be more explicit in critically analyzing test resource shortfalls impeding full test and evaluation of weapon systems.

The process of identifying and acquiring test resources needed during the DT&E phase of ASW weapons' development is not adequately focused. The Navy does not have a test resource office designated with responsibility for coordinating ASW test resource requirements and for supporting budget requests to satisfy those requirements. Moreover, ASW weapon project offices usually finance their own test resources in demonstrating their systems' DT&E objectives, thereby raising potential conflicts in funding priorities.

Principal Findings

Test Resource Capabilities

ASW test resources currently in use by the Navy do not completely represent enemy submarine capabilities and ocean environments in which they operate. As a result, ASW weapons' capabilities to close in on a target have not been completely demonstrated by in-water testing.

Fixed test ranges used by the Navy provide only limited environmental diversity. The Navy does not have mobile ranges to provide environmental diversity because other projects have had higher funding priorities.

Computer models used in ASW simulations do not fully depict important environmental factors. Since simulation is used heavily for performance prediction and analysis during final torpedo development phases, modeling limitations reduce the effectiveness of simulation in supplementing in-water tests and may increase technical risks of weapons not performing as intended.

The Navy recognizes target and simulation shortcomings exist, and efforts are underway to improve these capabilities. The Navy's Director, Research, Development, and Acquisition has budgeted for an improved target, but it will not be available in time to support the DT&E of the

ADCAP system. The Navy plans to use the improved target during OTAE on early production units of the MK-50 and on later production units of the ADCAP.

Test Resource Organization

The Navy does not have a high level focal point for test resources. Sponsors for weapon development, on the other hand, do exist at high levels within the Navy and they expect weapon project offices to identify and finance their own test resource needs from funds provided for weapon development. Navy studies have shown that weapon project offices are not likely to identify test resource limitations whose correction they are required to finance.

Recommendations

To improve the management focus over ASW test resources, GAO recommends that the Secretary of Defense direct the Secretary of the Navy to designate a sponsor for major ASW test resources such as targets, ranges, and generic simulation capabilities. GAO also recommends that the Secretary of the Navy direct the designated sponsor to

- ensure that Test and Evaluation Master Plans contain analyses of the effects that test resource limitations have on the usefulness and validity of test results,
- consolidate and prioritize test resource limitations to determine those having the greatest need for funding, and
- ensure that all acquisition milestone presentations give sufficient consideration to test resource needs and the extent to which OTAE performance requirements may not be fully demonstrated due to limitations in test resources.

Agency Comments

DOD concurred with the basic message of GAO's report that the acquisition process for ASW weapon systems can be enhanced by an improved management focus on test resources. DOD's detailed comments on the report's findings and recommendations can be found in appendix VIII. GAO's response to DOD's comments are included in chapter 4.

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